AMENDMENTS TO THE CLAIMS

Please **AMEND** claims 84 and 85 as follows.

The claims in this listing will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1 – 83. (Canceled).

84. (Currently Amended) A power autonomous portable electric tool set, comprising:

a first sub-unit generating a mechanical operation of a tool comprising an electric actuator;

a portable second sub-unit forming an electric energy source of the set comprising a battery and at least one electric or electronic module located in a vicinity of the battery for at least one of controlling and managing the battery;

a third charger sub-unit for electrically recharging the battery comprising at least one electric supply source, wherein the third charger sub-unit adapts a voltage and a current of the at least one electric supply source to recharge the battery; and

a cutoff device structured and arranged to cutoff an electric supply of the electric actuator,

wherein the first sub-unit is electrically disconnectably connectable to the second sub-unit, ~~and~~

wherein the third sub-unit is electrically disconnectably connectable to the second sub-unit,

wherein the battery comprises one of a rechargeable electrochemical lithium-ion or rechargeable electrochemical lithium polymer battery,

wherein at least one of the at least one electric or electronic module and the cutoff device are operable to prevent overcharging of the battery during a charging phase, and

wherein the at least one of the at least one electric or electronic module and the cutoff device are operable to prevent over-discharging of the battery during operation of the tool.

85. (Currently Amended) The electric tool set according to claim 84, wherein the battery ~~comprises one of a rechargeable electrochemical lithium-ion or rechargeable electrochemical lithium polymer battery,~~ is formed by an association of a series of cells, each cell comprising one of one element and a plurality of associated parallel elements.

86. (Previously Presented) The electric tool set according to claim 84, further comprising a first flexible disconnectable electrical cord, wherein the first sub-unit is electrically disconnectably connectable to the second sub-unit by the first flexible disconnectable electrical cord.

87. (Previously Presented) The electric tool set according to claim 84, further comprising a second flexible disconnectable electrical cord, wherein the third sub-unit is electrically disconnectably connectable to the second sub-unit by the second flexible disconnectable electrical cord.

88. (Previously Presented) The electric tool set according to claim 84, wherein the cutoff device is structured and arranged to cutoff an electric power supply of the electric actuator at least one of automatically and manually.

89. (Previously Presented) The electric tool set according to claim 84, wherein the cutoff device is structured and arranged to cutoff an electric power supply of the electric actuator when the battery reaches a voltage threshold harmful to its functioning.

90. (Previously Presented) The electric tool set according to claim 84, wherein the tool is one of pruning scissors, a saw, a fruit picking tool, a lawnmower, a bush cutter, a hedge cutter, an impact spanner and a pneumatic hammer.

91. (Previously Presented) The electric tool set according to claim 86, wherein the first flexible disconnectable electrical cord comprises a first connector couplable to the first sub-unit.

92. (Previously Presented) The electric tool set according to claim 86, wherein the first flexible disconnectable electrical cord comprises a second connector couplable to the second sub-unit.

93. (Previously Presented) The electric tool set according to claim 86, the first flexible disconnectable electrical cord comprises a first connector couplable to the first sub-unit and a second connector couplable to the second sub-unit.

94. (Previously Presented) The electric tool set according to claim 84, wherein the first sub-unit includes the cutoff device for automatically cutting off an electric supply of the first sub-unit when a battery voltage of the battery has reached a minimum low level prior to a deterioration, characterized by a significant loss of battery capacity and an increase of battery spontaneous discharge.

95. (Previously Presented) The electric tool set according to claim 84, wherein one module of the at least one electric or electronic modules includes the cutoff device to automatically cut off an electric supply of the first sub-unit when a voltage of battery has reached a minimum low level prior to a deterioration of the battery, characterized by significant loss of battery capacity and increase of battery spontaneous discharge.

96. (Previously Presented) The electric tool set according to claim 84, wherein one module of the at least one electric or electronic modules includes the cutoff device to automatically cut off the electric charge of the battery when a voltage delivered by the third charger sub-unit has reached a maximum value prior to a deterioration of the battery, characterized by significant loss of battery capacity and increase of battery spontaneous discharge.

97. (Previously Presented) The electric tool set according to claim 84, wherein one module of the at least one electric or electronic modules includes the cutoff device to automatically cut off an electric charging of the battery when a charging current for the battery has reached a minimum low level recommended or required by the manufacturer of the battery.

98. (Previously Presented) The electric tool set according to claim 84, wherein one module of the at least one electric or electronic modules protects the battery against short circuits.

99. (Previously Presented) The electric tool set according to claim 98, wherein the one module of the at least one electric or electronic modules comprises a fuse arranged at least at one of the terminals of the battery to protect the battery against the short circuits.

100. (Previously Presented) The electric tool set according to claim 98, wherein the one module of the at least one electric or electronic modules comprises a circuit breaker arranged at least at one of the terminals of the battery to protect the battery against the short circuits.

101. (Previously Presented) The electric tool set according to claim 84, wherein, during a period of non-use of the first sub-unit, one module of the at least one electric or electronic modules places the battery in one of a no-consumption mode and a very-low-consumption mode.

102. (Previously Presented) The electric tool set according to claim 101, wherein the one module of the at least one electric or electronic modules comprises a switch arranged at one of the terminals of the battery to place the battery in one of the no-consumption mode and the very-low-consumption mode.

103. (Previously Presented) The electric tool set according to claim 102, wherein the one module of the at least one electric or electronic modules further comprises one of a fuse and a

circuit breaker arranged at least at one of the terminals of the battery, wherein the switch is arranged after the one of the fuse and the circuit breaker.

104. (Previously Presented) The electric tool set according to claim 84, wherein the third charger sub-unit includes the cutoff device to automatically cut off an electric charging of the battery when a voltage of the battery has reached a maximum high level prior to a degradation of the battery.

105. (Previously Presented) The electric tool set according to claim 84, wherein the third charger sub-unit includes the cutoff device to automatically cut off an electric charging of the second sub-unit when a charging current to the battery has reached a minimum low level recommended or required by a manufacturer of the battery.

106. (Previously Presented) The electric tool set according to claim 84, wherein elements of battery of the second sub-unit are in a commercial 18650 size.

107. (Previously Presented) The electric tool set according to claim 84, wherein the at least one electric or electronic module comprises a single control module composed of at least one electronic board with at least one digital processing unit associated with a memory and at least one of annexed digital circuits and analog circuits.

108. (Previously Presented) The electric tool set according to claim 107, wherein the at least one digital processing unit comprises at least one of a microprocessor, a microcontroller, and a digital signal processor.

109. (Previously Presented) The electric tool set according to claim 84, wherein the battery comprises an association of a series of cells, and wherein the at least one electric or electronic module at least one of manages a charging, manages a discharging, balances a charging of each cell of the battery, evaluates and displays a capacity of the battery, protects the battery during a discharging against excess current when the tool is being used, manages the tool during storing phases, manages alarms, manages information, transmits information collected, and manages diagnostics.

110. (Previously Presented) The electric tool set according to claim 109, wherein the at least one electric or electronic module is structured and arranged to constantly exploit voltage measuring values of each cell of the battery in performing at least one of the managing of the charging, the managing of the discharging, the balancing of the charging of each cell, and the evaluating and the displaying of the capacity of the battery.

111. (Previously Presented) The electric tool set according to claim 84, wherein the battery further comprises n serially associated cells and the at least one electric or electronic module comprises a digital processing unit having an input analog/digital converter, and the electric tool set further comprises:

an acquisition electronic chain comprising identical n analog modules mounted at terminals of the n cells to measure voltage values for each cell;

at least one analog multiplexer; and

an adapted circuit,

wherein the voltage values measured by the n analog modules are directed, one after the other, by the at least one analog multiplexer toward the input analog/digital converter after amplification by the adapted circuit.

112. (Previously Presented) The electric tool set according to claim 111, further comprising a differential electronic circuit with an operational amplifier, using one of resistances and input resistive elements, being arranged to subtract a voltage measured at a negative terminal of a cell from a voltage measurement of a positive terminal of the cell.

113. (Previously Presented) The electric tool set according to claim 112, wherein the one of resistances and input resistive elements have an impedance greater than or about 1 Mohm, to obtain very low leakage currents.

114. (Previously Presented) The electric tool set according to claim 113, wherein the leakage currents are less than $1/20000^{th}$ per hour of a total capacity of the battery.

115. (Previously Presented) The electric tool set according to claim 111, wherein the voltage measuring values of each cell are delivered with a measuring precision of at least 50 mV.

116. (Previously Presented) The electric tool set according to claim 115, wherein the measuring precision of at least 50 mV is obtained by calibration during a manufacture of an electronic board of the at least one electric or electronic module.

117. (Previously Presented) The electric tool set according to claim 116, wherein the calibration includes:

substituting at least one very precise reference voltage for the measured voltages at the terminals of each cell; and

programmatically inputting error correcting parameters in the digital processing unit, for each voltage measuring module, as a function of a measurement of the at least one very precise reference voltage.

118. (Previously Presented) The electric tool set according to claim 111, further comprising dissipating circuits including electronic switchers associated with resistive elements, wherein a balancing of the charging of the cells with respect to one another is managed by the digital processing unit controlling a change in a charging current with the dissipating circuits.

119. (Previously Presented) The electric tool set according to claim 111, further comprising:

a discharge switching component; and

a sound or visual warning signal,

wherein managing a discharging comprises:

constantly checking voltage measuring values of each cell by the digital processing unit;

interrupting the discharging when the digital processing unit detects that one of the voltages measuring values of a cell has reached a minimum discharge threshold recommended by the manufacturer of the battery; and

cutting off the discharging by deactivating the discharge switching component, resulting in the tool being stopped, and by activating the sound or visual warning signal.

120. (Previously Presented) The electric tool set according to claim 111, further comprising an analog electronic circuit, which measures a charging and discharging current of the battery, wherein managing a charging, evaluating and displaying a capacity of the battery and protecting against excess current during a discharging are continuously managed by the digital processing unit in conjunction with the analog electronic circuit.

121. (Previously Presented) The electric tool set according to claim 120, further comprising a charge switching component controlled by the digital processing unit, wherein, while the third charger sub-unit is connected to the second sub-unit in an area of an electronic board of the electric or electronic module controlling the battery, during the managing of the charging, an end of the charging is obtained by opening the charge switching component when, by the analog electronic circuit measuring the charging and discharging current, the digital processing unit at least one of:

detects a drop in the charging current for the battery down to a recommended threshold,

detects a temperature of the battery exceeding an authorized limiting value; and

detects the charging continuing for a period of time that is greater than a given fraction of a theoretical charge time.

122. (Previously Presented) The electric tool set according to claim 121, wherein the recommended threshold is about 50 mA.

123. (Previously Presented) The electric tool set according to claim 121, wherein the authorized limiting value is about 45°C.

124. (Previously Presented) The electric tool set according to claim 121, wherein the given fraction of the theoretical charge time is about 20%.

125. (Previously Presented) The electric tool set according to claim 121, wherein the digital processing unit manages the evaluating and the displaying the capacity of the battery during the charging and during use of the tool by calculating the capacity by constantly accounting for capacity information related to:

an instantaneous charging and discharging current of the battery determined by the analog electronic circuit; and

the voltage measuring values of each cell.

126. (Previously Presented) The electric tool set according to claim 125, wherein the capacity information is further related to an average internal resistance of each cell.

127. (Previously Presented) The electric tool set according to claim 120, wherein the protecting against excess current protects the battery from premature aging or from overheating during a discharging of the battery during use of the tool and comprises:

cutting off a discharging current in a case of at least one of a very substantial pulsed overload of a maximum discharging current allowed for the battery and an excess of a maximum temperature allowed for the battery; and

limiting the discharging current as a function of an energy consumed by the tool during a certain sliding time period,

wherein the values of the energy and the sliding time period are experimentally predetermined as a function of the tool, the tool's use and a cycle life desired for the battery.

128. (Previously Presented) The electric tool set according to claim 127, further comprising:

a control stage; and

a discharge switching component,

wherein limiting the discharging current is managed by the at least one digital processing unit by applying a pulse width modulation (PWM) control, generated one of directly by the at least one digital processing unit and by a special component, through the control stage, to the discharge switching component.

129. (Previously Presented) The electric tool set according to claim 128, wherein the discharge switching component comprises an N-channel MOSFET type component.

130. (Previously Presented) The electric tool set according to claim 109, further comprising resistive circuits connected in parallel on each cell,

wherein the at least one digital processing unit automatically undertakes a storage managing task when the electric tool set is not being charged and has not been used for a given period of time, the storage managing task comprising:

verifying whether or not a residual capacity of the battery is greater than a storage capacity recommended by a manufacturer of the battery;

if the residual capacity is greater than the storage capacity, the at least one digital processing unit initiating an automatic discharging of the battery by the resistive circuits, until the storage capacity is reached, and stopping all electronic circuits while placing the at least one digital processing unit in low consumption stand-by mode; and

if the residual capacity is below the storage capacity, the at least one digital processing unit setting off at least one of a sound alarm and a visual alarm.

131. (Previously Presented) The electric tool set according to claim 130, wherein the given period of time is 10 days.

132. (Previously Presented) The electric tool set according to claim 107, wherein the second sub-unit further comprises connection terminals,

wherein the at least one digital processing unit detects a live connection of the third charger sub-unit to the battery of the second sub-unit by a voltage measurement by the control module at least at one of the connection terminals.

133. (Previously Presented) The electric tool set according to claim 132, further comprising a particular adapted measuring circuit, wherein the detecting the live connection is carried out by the particular adapted measuring circuit, facilitating initiation of an automatic recharging of the battery while the tool is stored in a non-use phase, by detecting an instant when at least one cell has reached a minimum voltage recommended by a manufacturer.

134. (Previously Presented) The electric tool set according to claim 132, wherein when the control module detects an excessive or insufficient voltage of the third charger sub-unit in an area of the connection terminals, the digital processing unit interrupts a charging and sets off at least one of a sound alarm and a visual alarm.

135. (Previously Presented) The electric tool set according to claim 109, further comprising:

a digital processing unit memory;

a separate operating terminal; and

at least one of a wire connection, a radio frequency connection, and an infrared connection to the separate operating terminal,

wherein the managing of information and the managing of diagnostics comprises storing information acquired during use of the tool in the digital processing unit memory, the information being transmittable by the at least one of the wire connection, the radiofrequency connection, and the infrared connection to the separate operating terminal.

136. (Previously Presented) The electric tool set according to claim 135, wherein the information acquired includes at least one of a number of recharges, a computation of a number

of hours the tool was used, a change in the capacity of the battery in time, and an average energy consumed by the tool.

137. (Previously Presented) The electric tool set according to claim 135, wherein the separate operating terminal is at least one of a personal computer, an electronic personal assistant, and a GSM.

138. (Previously Presented) The electric tool set according to claim 135, wherein the separate operating terminal is connectable to the Internet.

139. (Previously Presented) The electric tool set according to claim 107, wherein the first sub-unit further comprises an electric actuator module for controlling the electric actuator, and wherein the control module is associated with the electric actuator module on the electronic board, with both the control module and the electric actuator module using a same digital processing unit of the at least one digital processing unit.

140. (Previously Presented) The electric tool set according to claim 111, further comprising a charge switching component,

wherein the at least one electric or electronic module further comprises a control module, which comprises, for each cell, safety redundant circuits for stopping a charging, and

wherein, in a case of a voltage overload of a cell, each safety redundant circuit is individually capable of controlling a general interruption of the charging by directly deactivating the charge switching component without biasing the at least one digital processing unit.

141. (Previously Presented) The electric tool set according to claim 120, wherein the control module further comprises a discharge stopping redundant circuit,

wherein if the analog electronic circuit detects a discharging current equal to or greater than a maximum value allowed for the battery, the discharge stopping redundant circuit interrupts the discharging by directly deactivating the discharge switching component without biasing the digital processing unit.

142. (Previously Presented) The electric tool set according to claim 84, wherein the third charger sub-unit further comprises a special circuit for regulating voltage and current, wherein the special circuit generates a voltage with a precision approximating 0.5% and a controlled current.

143. (Previously Presented) The electric tool set according to claim 84, further comprising at least one of specific protective casings and specific gripping casings for each of the first sub-unit, second sub-unit and third charging sub-unit, in which each of the first sub-unit, second sub-unit and third charging sub-units are respectively mounted.